TABLE 3.7.1

PRIMARY CONTAINMENT ISOLATION

Isolation Group	Valve Identification	Number of Valves		Maximum Operating Time (Sec)	Normal Position
		Inboard	Outboard		
1	Main Steam Line Isolation	4	4	$3 \leq T \leq 5$	Open
1	Main Steam Line Drain	1	1	60	Closed
1	Recirculation Loop Sample Line	1	1	60	Closed
2	Drywell Floor Drain		2	60	Open
2	Drywell Equipment Drain		2	60	Open
2	Drywell Vent		2	60	Closed
2	Drywell Vent Bypass		1	60	Closed
2	Drywell Purge Inlet		2	60	Closed
2	Drywell and Suppression Chamber Air Makeup		1	60	Closed
2	Suppression Chamber Vent		2	60	Closed
2	Suppression Chamber Vent Bypass		1	60	Closed
2	Shutdown Cooling System	1	1	120	Closed

3.0 LIMITING CONDITIONS FOR OPERATION

4. Pressure Suppression Chamber-Drywell Vacuum Breakers

a. When primary containment is required, all drywell-suppression chamber vacuum breakers shall be operable and positioned in the closed position as indicated by the position indication system, except during testing and except as specified in 3.7.A. 4.b and c, below.

b. Any drywell-suppression chamber vacuum breaker may be nonfully closed as indicated by the position indication system provided that drywell to suppression chamber differential pressure decay does not exceed that shown on Figure 3.7.1.

c. Up to two drywell-suppression chamber vacuum breakers may be inoperable provided that: (1) the vacuum breakersis determined to be fully closed as indicated by the position indication system or if drywell to suppression chamber differential pressure decay does not exceed that shown on Figure 3.7.1 or (2) the vacuum breaker is secured in the closed position.

4.0 SURVEILLANCE REQUIREMENTS

4. Pressure Suppression Chamber-Drywell Vacuum Breakers

a. Operability and full closure of the drywell-suppression chamber vacuum breakers shall be verified by performance of the following:

(1) Monthly each operable drywell-suppression chamber vacuum breaker shall be exercised through an opening-closing cycle.

(2) Once each operating cycle, drywell to suppression chamber leakage shall be demonstrated to be less than that equivalent to a one-inch diameter orifice and each vacuum breaker shall be visually inspected.

b. When the position of any drywell-suppression chamber vacuum breaker valve is indicated to be not fully closed at a time when such closure is required, the drywell to suppression chamber differential pressure decay shall be demonstrated to be less than that shown on Figure 3.7.1 immediately and following any evidence of subsequent operation of the inoperable valve until the inoperable valve is restored to a normal condition.

3.0 LIMITING CONDITIONS FOR OPERATION

5. Oxygen Concentration

a. After completion of the startup test program and demonstration of plant electrical output, the primary containment atmosphere shall be reduced to less than 5% oxygen with nitrogen gas whenever the reactor coolant pressure is above 110 psig in the power operating condition, except as specified in 3.7.A.5.b.

b. Within the 24-hour period subsequent to placing the reactor in the run mode following shutdown, the containment atmosphere oxygen concentration shall be reduced to less than 5% by weight, and maintained in this condition. Deinerting may commence 24 hours prior to leaving the run mode for a reactor shutdown.

4.0 SURVEILLANCE REQUIREMENTS

5. Oxygen Concentration

Whenever inerting is required, the primary containment oxygen concentration shall be measured and recorded on a weekly basis.

Bases Continued:

3.7 A. Primary Containment

The purpose of the vacuum relief valves is to equalize the pressure between the drywell and suppression chamber and between the suppression chamber and reactor building during loss of coolant accident so that structural integrity of the containment is maintained.

The vacuum relief system between the pressure suppression chamber and reactor building consist of two 100% vacuum relief breakers (2 parallel sets of 2 valves in series). Operation of either system will maintain the pressure differential less than 1 psig. The external design pressure is 2 psig. One valve may be out of service for repairs for a period of seven days. This period is based on the low probability that system redundancy would be required during this time. If repairs cannot be completed within seven days, the reactor coolant system is brought to a condition where vacuum relief is no longer required.

The capacity of the ten (10) drywell vacuum relief valves is sized to limit the pressure differential between the suppression chamber and drywell during post-accident drywell cooling operations to less than the design limit of 2 psig. The relief valves are sized on the basis of the Bodega Bay pressure suppression system tests. Since they are in series with the reactor building to suppression chamber vacuum relief valves pressure drop across these valves must be included in the evaluation of drywell negative pressures, even though there does not appear to be a mechanism for causing negative pressures in excess of the 2 psig design pressure. With eight of the ten valves in service, the differential pressure across the valves for maximum flow conditions would increase approximately 12% above the ten valve differential pressure. With this additional pressure drop the total differential pressure would still be less than the 2 psig design external pressure of the drywell. Containment integrity would therefore not be impaired.

In addition to the above considerations, postulated leakage through the vacuum breaker to the suppression chamber air space could result in a partial bypass of pressure suppression in the event of a LOCA or a small or intermediate steam leak. This effect could potentially result in exceeding containment design pressure. As a result of the leakage potential, the containment response has been analyzed for a number of postulated conditions. It was found that the maximum allowable bypass area for any postulated break size was equivalent to a six-inch diameter orifice.[1] This bypass corresponds to a

[1] Report on Torus to Drywell Vacuum Breaker Tests and Modifications for Monticello Nuclear Generating Plant, dated March 12, 1973, submitted to Mr. D J Skovholt, AEC-DL, from Mr. L O Mayer, NSP

3/4 inch opening of any one valve or 1/8 inch opening for all ten valves, measured at the bottom of the disc. The position indication system is designed to detect closure within 1/8 inch at the bottom of the disc.

At each refueling outage and following any significant maintenance on the vacuum breaker valves, positive seating of the vacuum breakers will be verified by leak test. The leak test is conservatively designed to demonstrate that leakage is less than that equivalent to leakage through a one-inch orifice which is about 3% of the maximum allowable. This test is planned to establish a baseline for valve performance at the start of each operating cycle and to ensure that vacuum breakers are maintained as nearly as possible to their design condition. This test is not planned to serve as a limiting condition for operation.

During reactor operation, an exercise test of the vacuum breakers will be conducted monthly. This test will verify that disc travel is unobstructed and will provide verification that the valves are closing fully, through the position indication system. If one or more of the vacuum breakers does not seat fully as determined from the indicating system, a leak test will be conducted to verify that leakage is within the maximum allowable. Since the extreme lower limit of switch detection capability is approximately 1/16", the planned test is designed to strike a balance between the detection switch capability to verify closure and the maximum allowable leak rate. A special test was performed to establish the basis for this limiting condition. During the first refueling outage all ten vacuum breakers were shimmed 1/16" open at the bottom of the disc. The bypass area associated with the shimming corresponded to 50% of the maximum allowable.[1/] The results of this test are shown in Figure 3.7.1.

When a drywell-suppression chamber vacuum breaker valve is exercised through an opening-closing cycle, the position indicating lights at the remote test panels are designed to function as follows:

Full Closed	2 Green	- On
	2 Red	- Off
Intermediate Position	2 Green	- Off
	2 Red	- Off
Full Open	2 Green	- Off
	2 Red	- On

The remote test panel consists of a push button to actuate the air cylinder for testing, two red lights, and two green lights for each of the ten valves. There are four indpendent limit switches on each valve. The two switches controlling the green lights are adjusted to provide an indication of disc opening of less than 1/8" at the bottom of the disc. The two switches controlling the red lights are adjusted to provide indication of the disc very near the full open position.

Operability of a vacuum breaker valve and the four associated indicating light circuits shall be established by cycling the valve. The sequence of the indicating lights will be observed to be that previously described. If both green light circuits are inoperable, the valve shall be considered inoperable and a pressure test is required immediately and upon indication of subsequent operation. If both red light circuits are inoperable, the valve shall be considered inoperable, however, no pressure test is required if positive closure indication is present.

The 5% oxygen concentration minimizes the possibility of hydrogen combustion following a loss of coolant accident. Significant quantities of hydrogen could be generated if the core cooling systems failed to sufficiently cool the core. The occurrence of primary system leakage following a major refueling outage or other scheduled shutdown is more probable than the occurrence of the loss of coolant accident upon which the specified oxygen concentration limit is based. Permitting access to the drywell for leak inspections during a startup is judged prudent in terms of the added plant safety offered without significantly reducing the margin of safety. Thus, to preclude the possibility of starting the reactor and operating for extended periods of time with significant leaks in the primary (Continued on page 159)

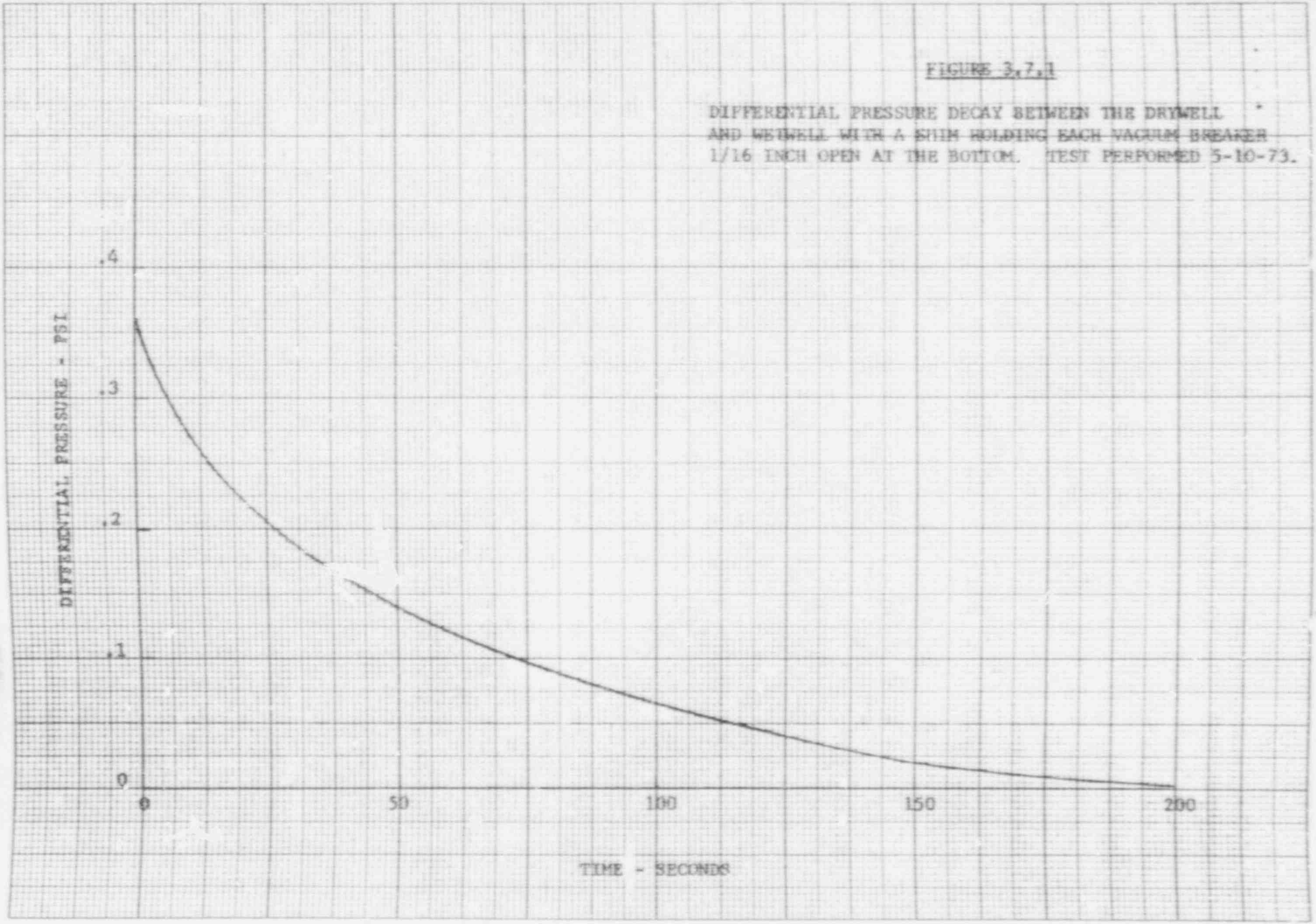

FIGURE 3.7.1

DIFFERENTIAL PRESSURE DECAY BETWEEN THE DRYWELL AND WETWELL WITH A SHIM HOLDING EACH VACUUM BREAKER 1/16 INCH OPEN AT THE BOTTOM. TEST PERFORMED 5-10-73.